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BIOASSAY TESTING SERVICES

Acute and Chronic Toxicity Testing

February 7, 1991

Greg Speer
Alaskan Copper
628 South Hanford
Seattle, WA 98124

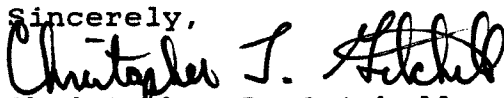
Dear Greg,

Enclosed is the result of the Hazardous Waste Characterization test to determine if your sample number M18524 "D" is a dangerous, extremely hazardous or solid waste following DOE WAC 173-303 method 80-12.

As you can see from the results there were no mortalities at either the 100 or 1000 ppm dilutions. This material would simply be classified as a solid waste as far as bioassays are concerned.

If you have any questions about the data or I can be of any further assistance to you please do not hesitate to call.

Sincerely,


Christopher L. Getchell
Oceanographer/Biologist

BIOASSAY TESTING SERVICES
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Tacoma, WA 98465
(206) 565-5492

STATIC ACUTE FISH TOXICITY TEST

Customer Name: Alaskan Copper
Address: 628 South Hanford
Seattle, WA 98124

Contact: Greg Speer
Phone: (206) 623-5800 ext. 569

Sample Identification: Sample "D"
Analysis Performed: Hazardous Waste Characterization

TEST METHOD:

1. **Toxicity test method used:**
Salmonid survival test- "General Procedure for Static-Bioassay to Evaluate Industrial Effluent Toxicity," Washington Department of Ecology. Revised January 24, 1984; and Biological Testing Methods. Part A, Static Acute Fish Toxicity Test." DOE 80-12. Revised July 1981.
2. **End point(s) of test:**
Mortality or 96 hours
3. **Deviations from reference method, if any, and the reason(s):**
No deviations
4. **Date and time test started:**
02/01/91, 1800hrs
5. **Date and time test terminated:**
02/05/91, 1800hrs
6. **Type of test Chamber:**
Glass chamber, 20"X10"X15"
7. **Volume of solution used/chamber:**
30 liters, 13" deep.
8. **Number of organisms/test chamber:**
10 organisms
9. **Number of replicate test chambers/treatment:**
3 replicates
10. **Acclimation of test organisms(mean and range):**
30 days, 10 to 90 days
11. **Test temperature (mean and range):**
12 degrees centigrade, (12.0, 11.9-12.2)

TEST ORGANISM:

1. **Scientific name:**
Salmo gairdneri(rainbow trout)

2. **Age:**
160 days
3. **Life stage:**
Fingerling
4. **Mean length, weight, and loading:**
4.4cm, 2.15gms, .72gm/l
5. **Source:**
Cascade Rainbow Trout Fish Farm
6. **Food:**
Trout chow
7. **Lighting:**
16 hours light, 8 hours dark, 50 to 100 foot candles
8. **Diseases and treatment:**
No diseases detected, no treatment necessary
9. **Dilution water used in test:**
Dechlorinated and aged municipal water

CHEMICAL ANALYSIS:

1. **Physical and chemical methods used:**
 - a. Temperature-Digital temperature probe
 - b. Dissolved oxygen-Membrane Electrode/Azide Modification
 - c. pH-Standard electrode
 - d. Conductivity-Conductivity meter
 - e. Hardness-Titrimetric/EDTA
 - f. Alkalinity-Titrimetric/Phenolphthalein-Sulfuric acid
 - g. Weight-Beam balance
 - h. Residual chlorine-Colorimetric/Ortho-tolidine
 - i. Ammonia-Colorimetric/Nesslerization
 - j. Nitrate-Colorimetric/Cadmium reduction

RESULTS:

1. **Concentration:**
 - a. 1000 mg/l(ppm)
 - b. 100 mg/l(ppm)
 - c. Control
 - d. Reference toxicant(25 ppb copper)
2. **Observed effects:**
 - a. 0/30 Mortalities
 - b. 0/30 No mortalities
 - c. 0/30 No mortalities
 - d. 0/10 - 0% mortality
3. **Raw biological data, including daily records of affected organisms in each concentration(including controls):**
 - a. See appendix "A"
 - b. See appendix "A"
 - c. See appendix "A"
 - d. See appendix "A"
4. **Summary table of physical and chemical data:**
 - a. See appendix "A"
 - b. See appendix "A"
 - c. See appendix "A"
 - d. See appendix "A"



Appendix "A" DATA SHEET FOR STATIC BASIC ACUTE FISH TOXICITY TEST*

Laboratory Bioassay Testing Lab.
Analyst Gutcher

Industry/Toxicant Alaskan Copper
Address Seattle, WA
Collector Cutler
Date Sample Collected 1/31/91

Beginning: Date 2/1/91 Time 1800
Ending: Date 2/5/91 Time 1800
Test Organism Rainbow Trout
Required Test Temperature Range 12°C ± 1.5°C

Laboratory Reference Number	Test Con- tainer No.	Conc. (mg/l)	Number of Cumulative Deaths					Dissolved Oxygen (mg/l)					pH 25 C					Temperature (C)					Total Hardness (mg/l as CaCO ₃)		Total Alkalinity (mg/l as CaCO ₃)		Conductivity uMHOS/cm	
			0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	0	96	0	96
Control		0	0	0	0	0	0	11.8	11.0	10.1	9.6	9.2	6.9	-	-	-	6.9	11.1	12.0	12.0	12.0	11.9	120	120	40	40	40	50
Sample	25	100	0	0	0	0	0	11.8	11.1	10.7	9.6	8.7	6.9	-	-	-	7.0	11.1	12.1	12.1	12.0	11.9	120	120	40	40	40	50
M18524D	38	"	0	0	0	0	0	11.7	10.7	10.0	9.2	8.5						12.0	12.1	12.2	12.1	12.0						
	20	"	0	0	0	0	0	11.8	11.3	10.5	9.7	8.9						11.9	11.9	12.0	11.9	11.8						
	27	1000	0	0	0	0	0	11.8	11.0	10.2	9.6	8.1	6.9	-	-	-	7.0	11.0	12.1	12.1	12.1	11.9	120	120	40	40	40	50
	18	"	0	0	0	0	0		11.3	10.7	10.0	9.1						12.1	12.1	12.1	12.0	12.0						
	47	"	0	0	0	0	0		10.9	10.1	9.3	8.7						12.0	11.9	11.9	11.9	11.9						

Sample Description Sludge
Average Weight 2.15 Mean Length 4.4 Longest 4.7 Shortest 3.7 Ratio (long/short) 1.28
Number of organisms per chamber 10 Ratio of flesh to water 1.2 gm/l Comments none

* Method on file with the Department of Ecology.

GENERAL PROCEDURE FOR STATIC BASIC ACUTE FISH TOXICITY TEST

ECY 030-1-40

DATA VERIFIED BY

EHW > 10/30

DW > 11/30

DATE 2/7/91